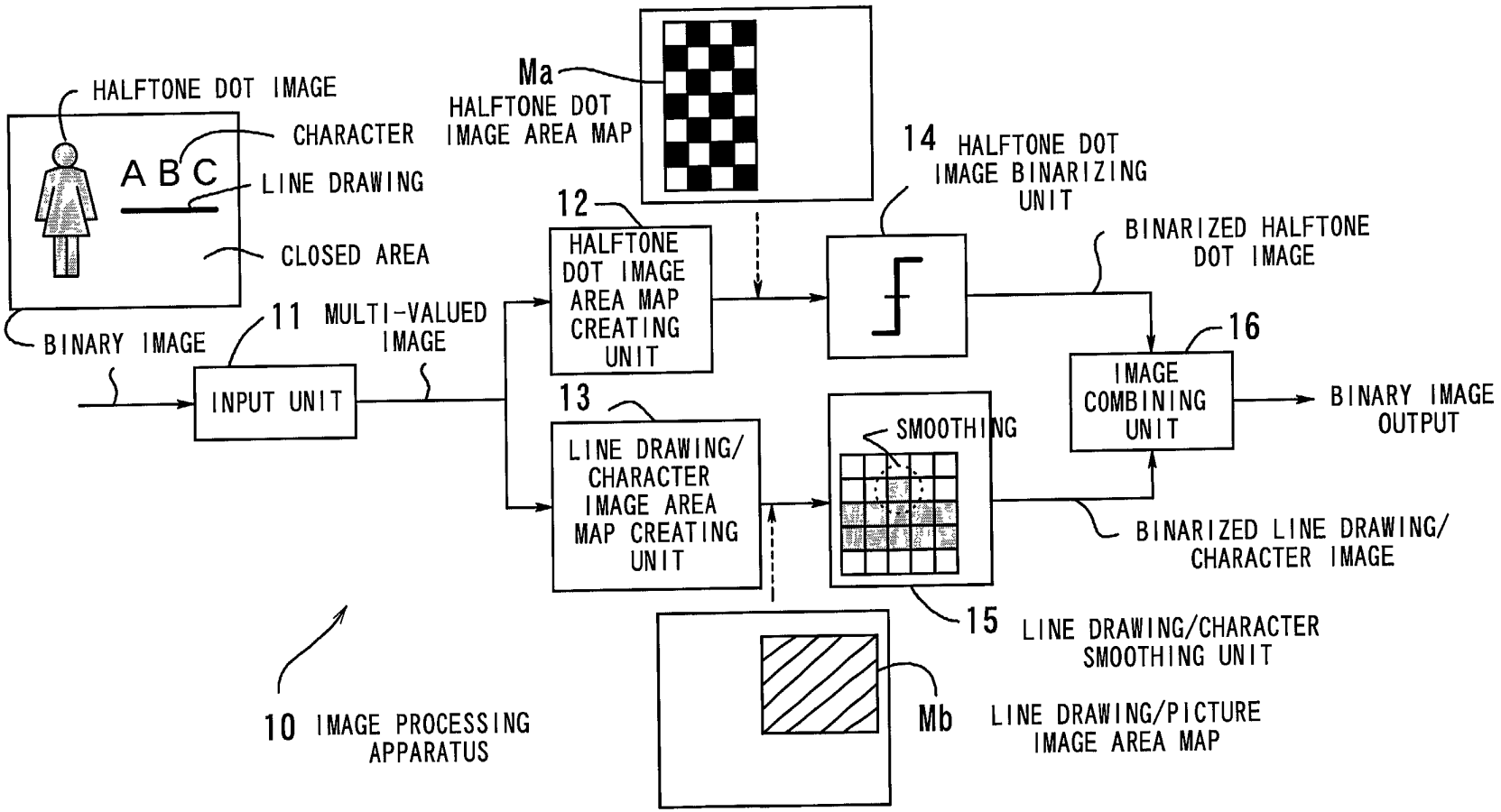


FIG. 1

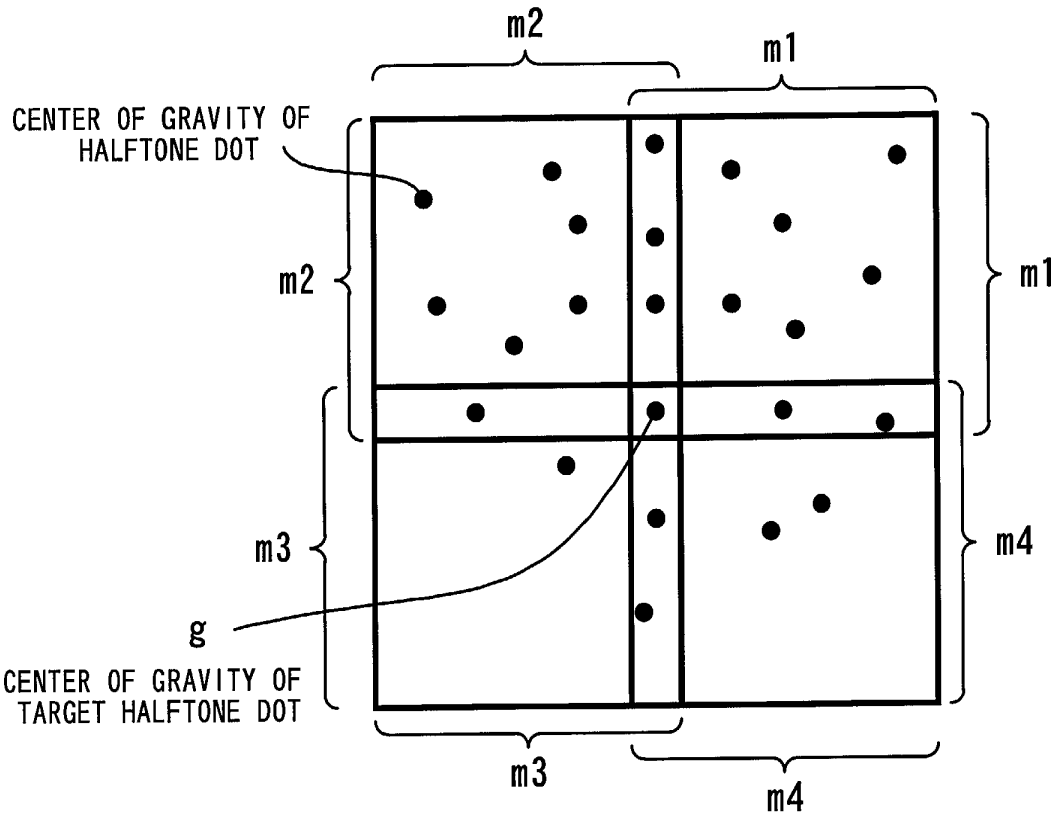


FIG. 2

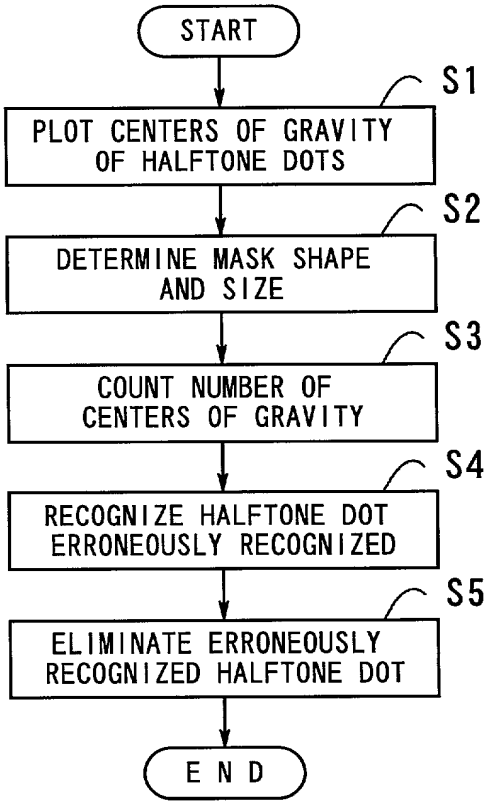

START
S1
PLOT CENTERS OF GRAVITY OF HALFTONE DOTS
S2
DETERMINE MASK SHAPE AND SIZE
S3
COUNT NUMBER OF CENTERS OF GRAVITY
S4
RECOGNIZE HALFTONE DOT ERRONEOUSLY RECOGNIZED
S5
ELIMINATE ERRONEOUSLY RECOGNIZED HALFTONE DOT
END

FIG. 3

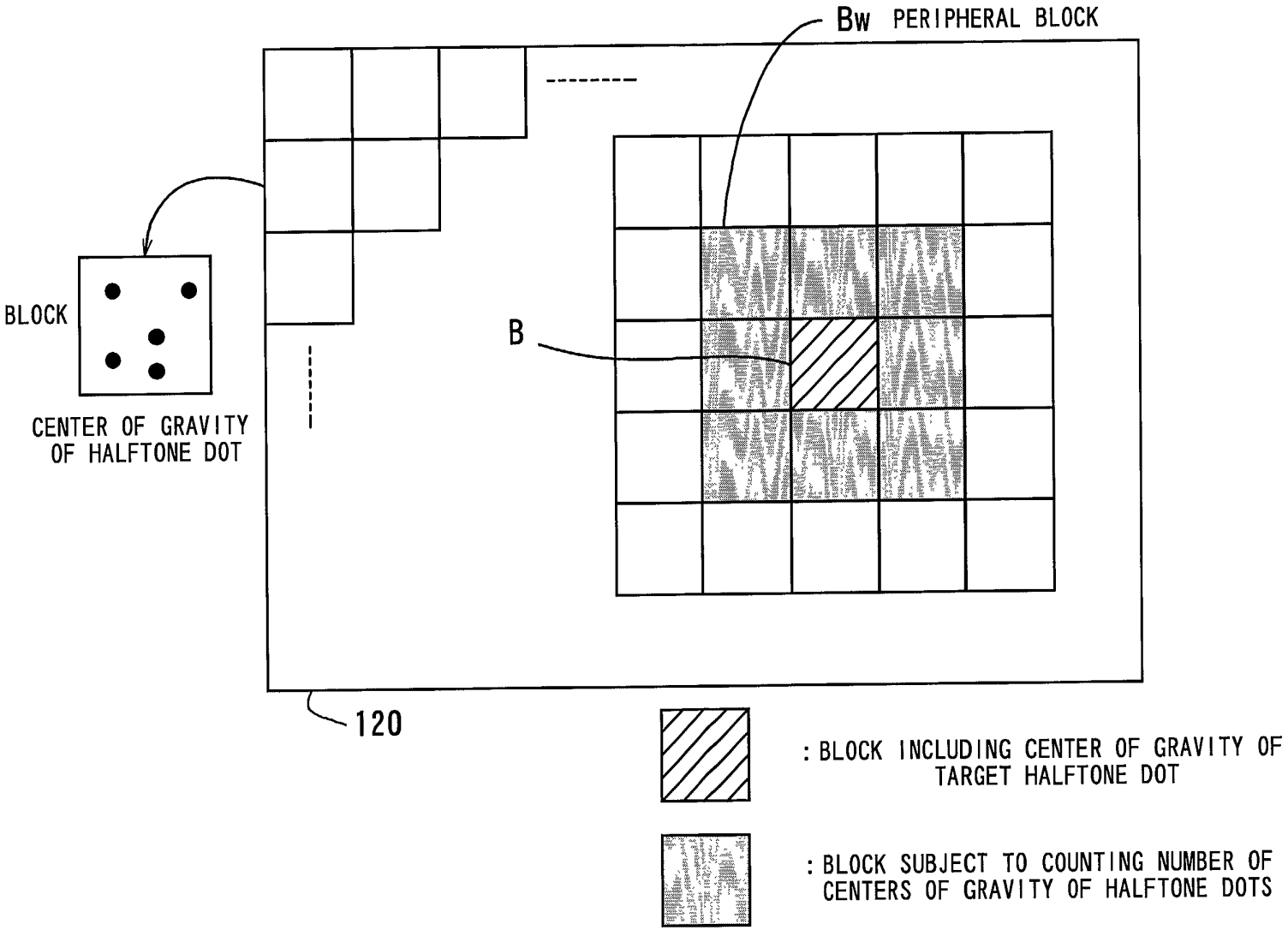


FIG. 4

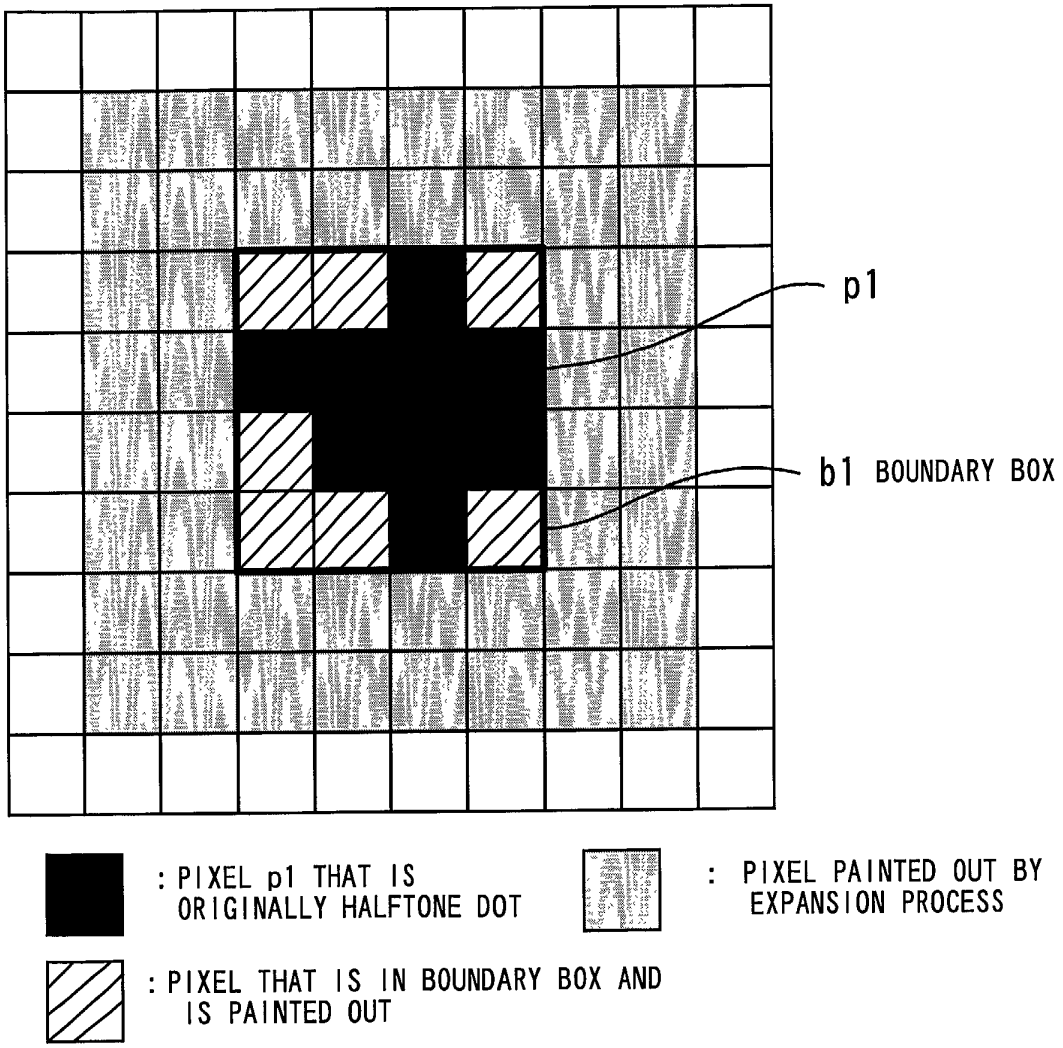

p1
b1 BOUNDARY BOX
: PIXEL p1 THAT IS ORIGINALLY HALFTONE DOT
: PIXEL PAINTED OUT BY EXPANSION PROCESS
: PIXEL THAT IS IN BOUNDARY BOX AND IS PAINTED OUT

FIG. 5

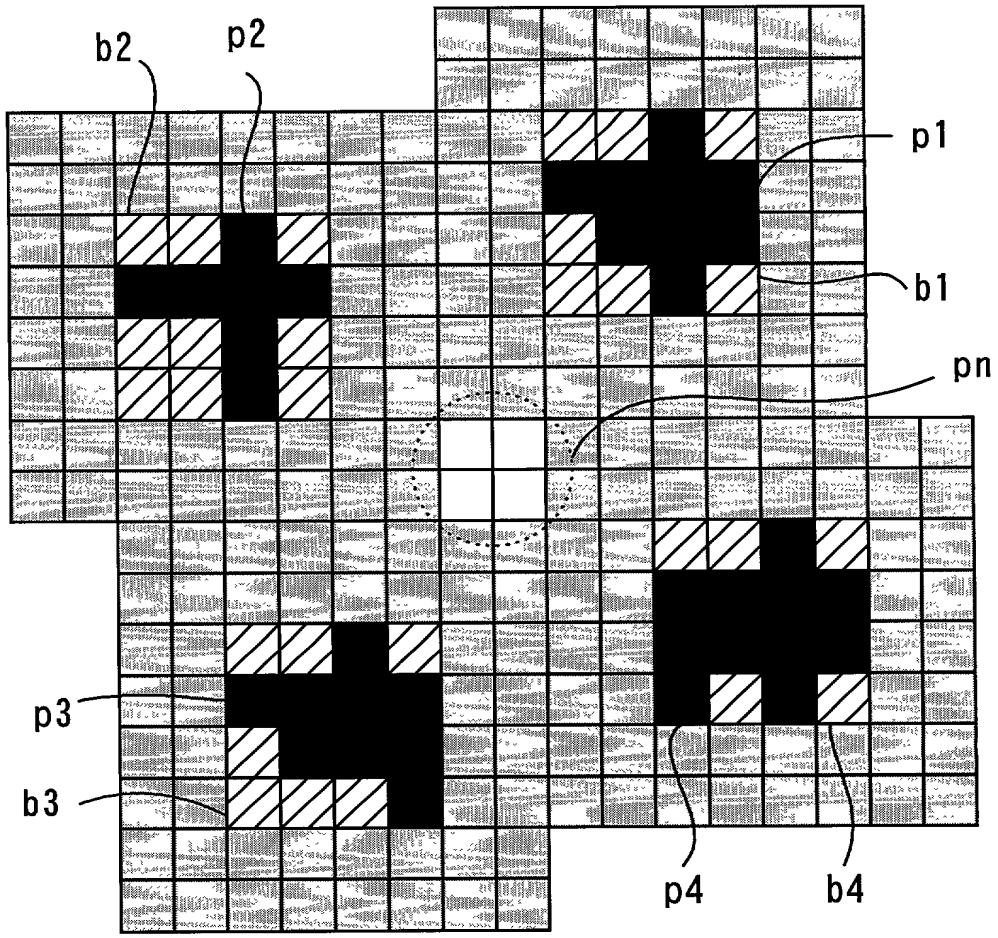

b2
p2
p1
b1
pn
p3
b3
p4
b4
: PIXEL p1 THAT IS ORIGINALLY HALFTONE DOT
: PIXEL PAINTED OUT BY EXPANSION PROCESS
: PIXEL THAT IS IN BOUNDARY BOX AND IS PAINTED OUT

FIG. 6

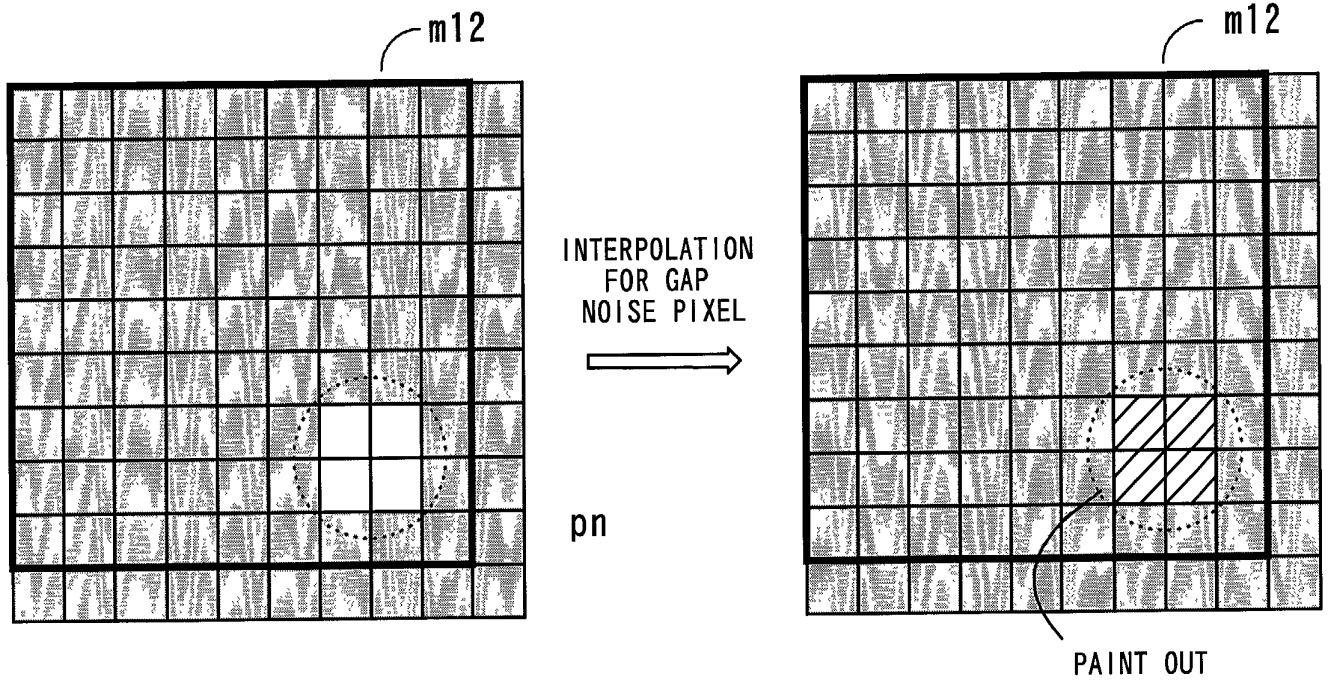


FIG. 7

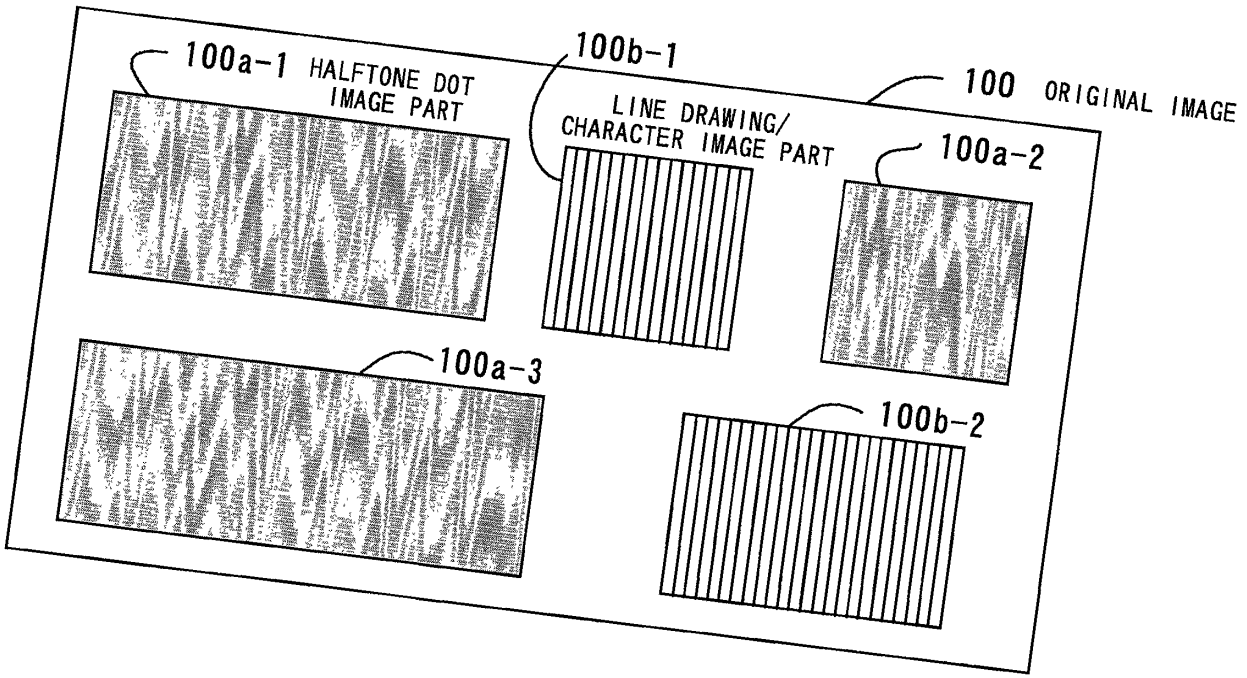

100a-1 HALFTONE DOT IMAGE PART
100b-1
LINE DRAWING/ CHARACTER IMAGE PART
100 ORIGINAL IMAGE
100a-2
100a-3
100b-2

FIG. 8

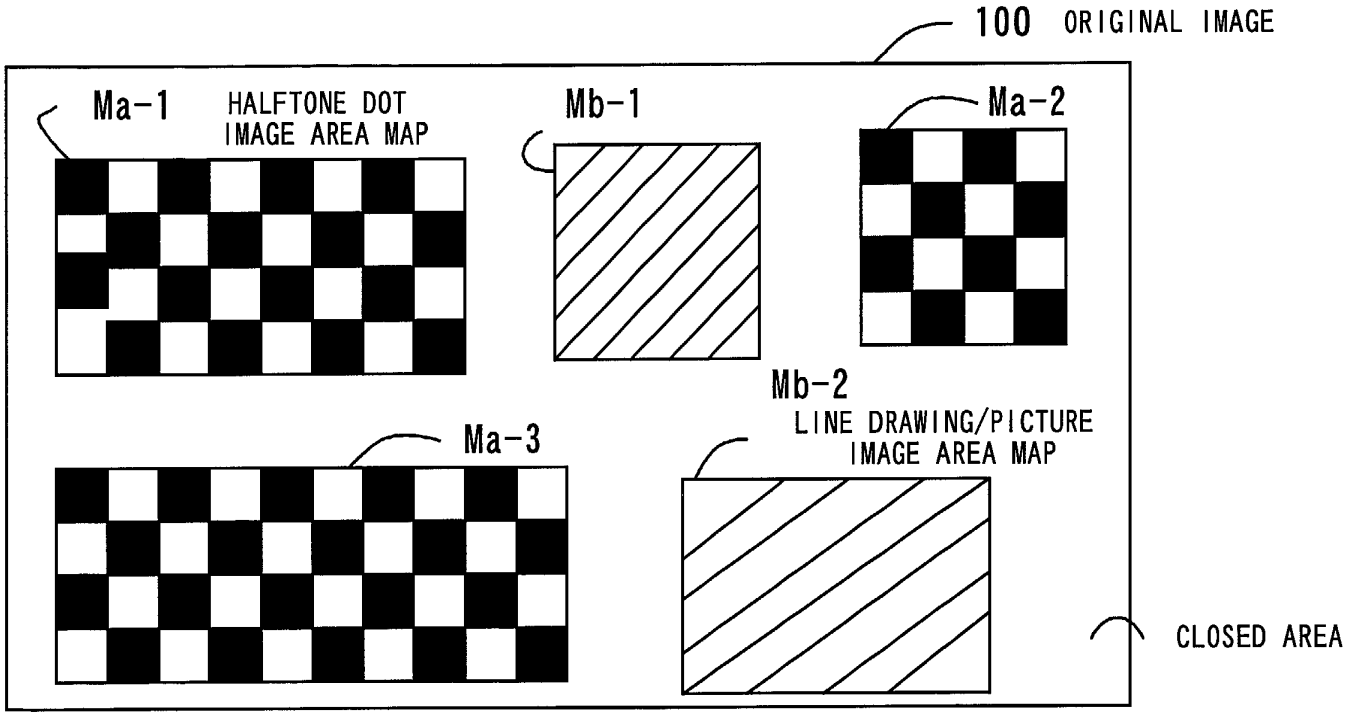


FIG. 9

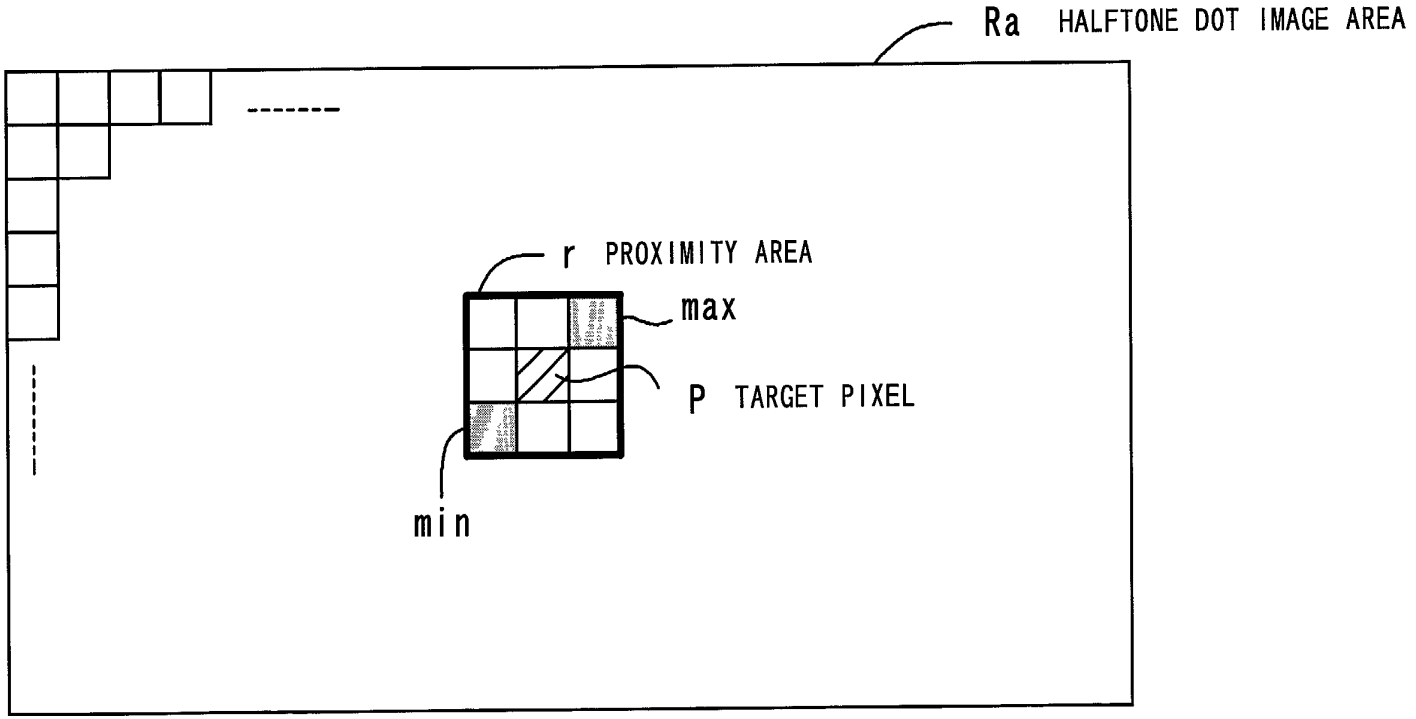


FIG. 10

r1 PROXIMITY AREA

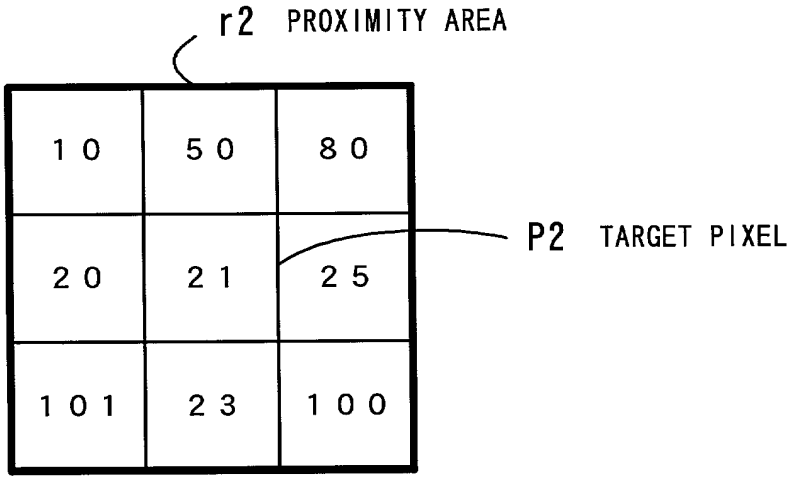
100	50	80
200	201	205
210	230	100

P1 TARGET PIXEL

CHANGED PIXEL VALUE Pa=230(MAXIMUM PIXEL VALUE AVAILABLE IN PROXIMITY AREA)*α

$0.0 < \alpha \leqq 1.0$

FIG. 11



CHANGED PIXEL VALUE Pb=230(MINIMUM PIXEL VALUE AVAILABLE IN PROXIMITY AREA)$*\beta$

$1.0 \leqq \beta$

FIG. 12

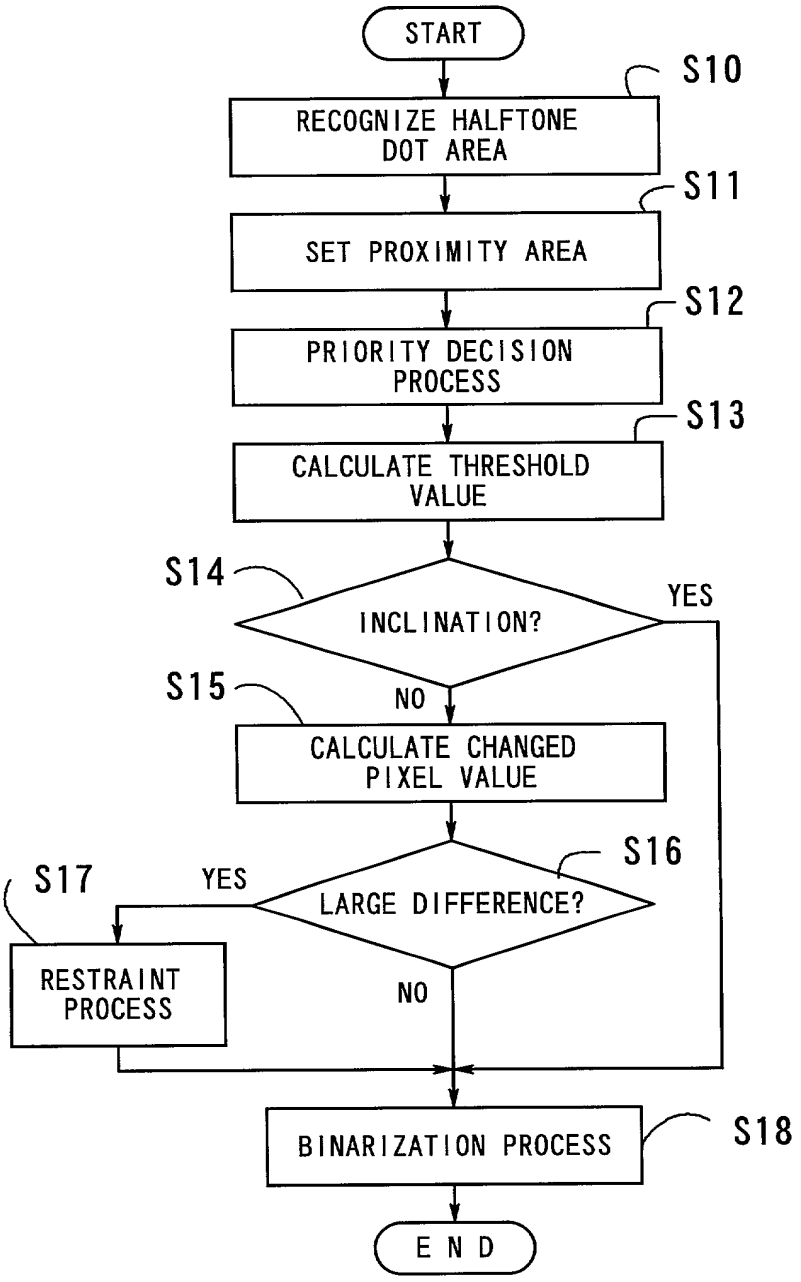

START
S10
RECOGNIZE HALFTONE DOT AREA
S11
SET PROXIMITY AREA
S12
PRIORITY DECISION PROCESS
S13
CALCULATE THRESHOLD VALUE
S14
INCLINATION?
YES
NO
S15
CALCULATE CHANGED PIXEL VALUE
S16
LARGE DIFFERENCE?
YES
S17
RESTRAINT PROCESS
NO
BINARIZATION PROCESS
S18
E N D

FIG. 13

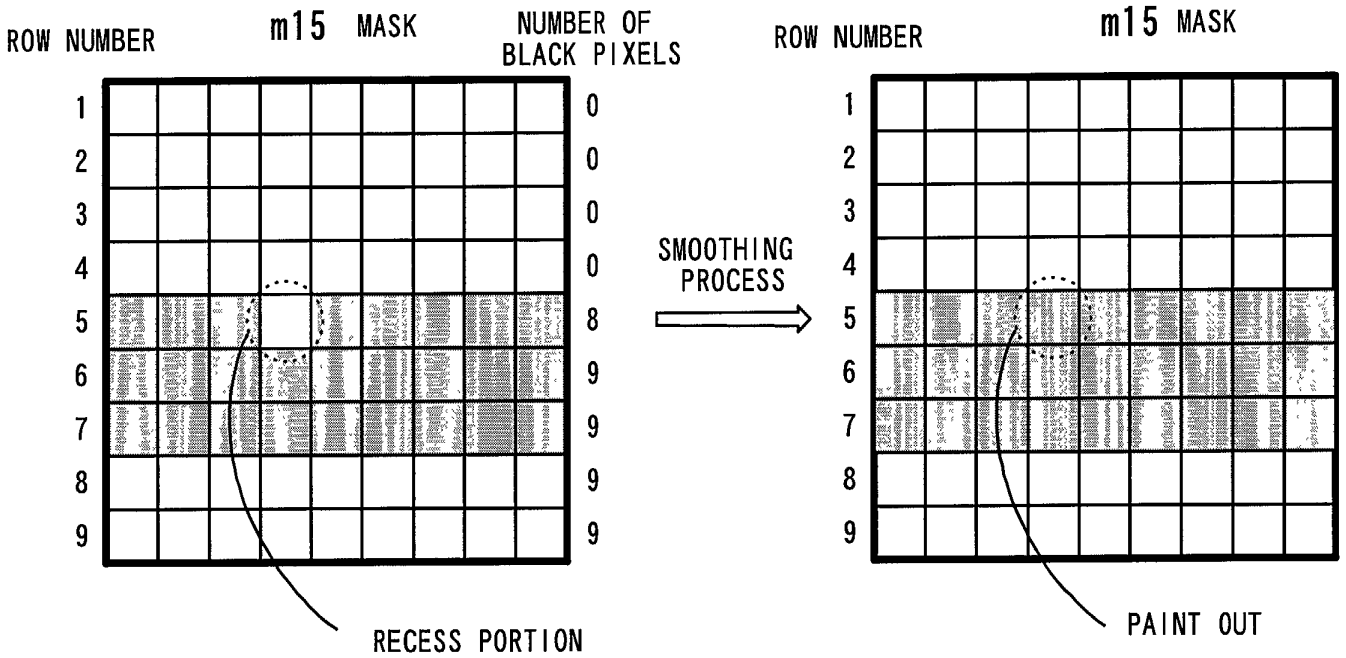

ROW NUMBER
m15 MASK
NUMBER OF BLACK PIXELS
1
2
3
4
5
6
7
8
9
0
0
0
0
8
9
9
9
9
RECESS PORTION
SMOOTHING PROCESS
ROW NUMBER
m15 MASK
1
2
3
4
5
6
7
8
9
PAINT OUT

FIG. 14

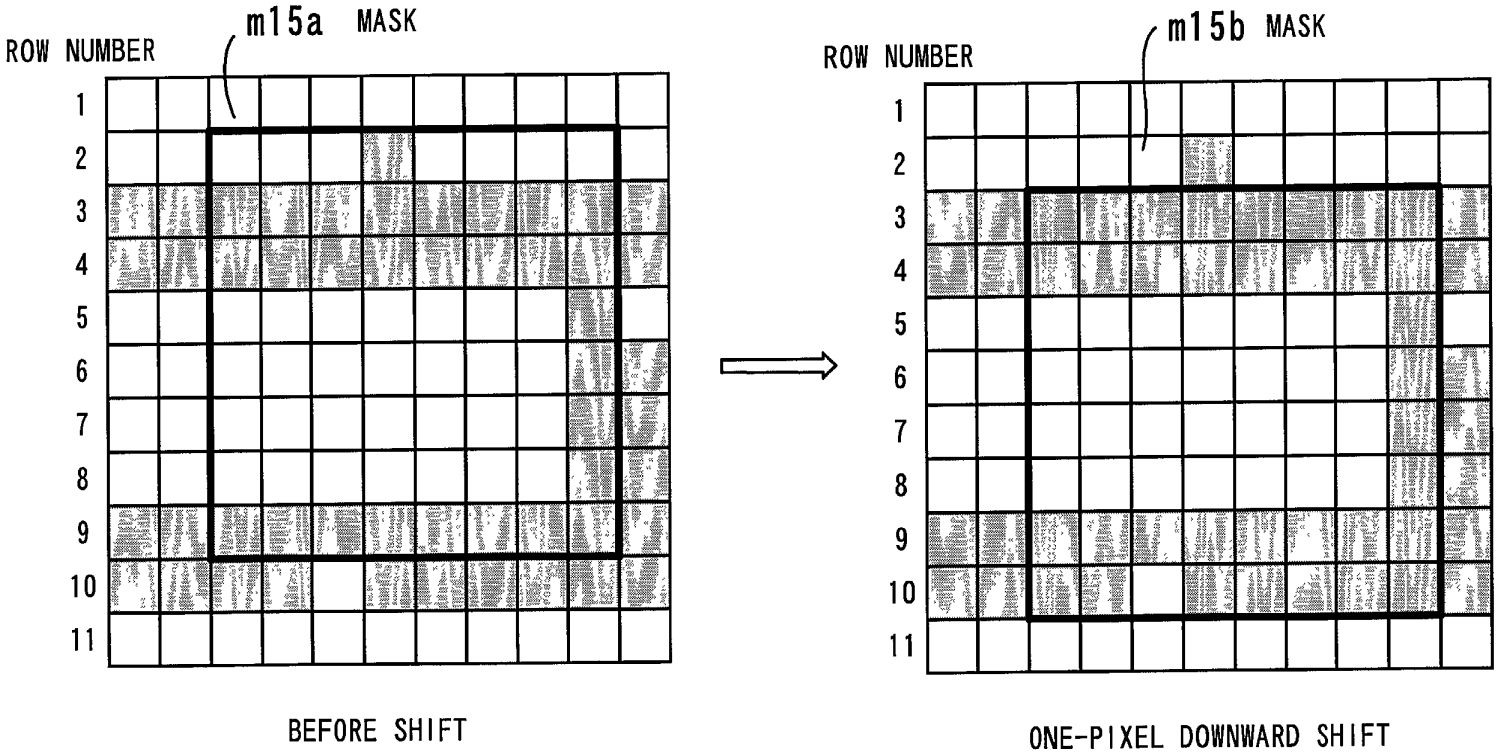

m15a MASK
ROW NUMBER
1
2
3
4
5
6
7
8
9
10
11
BEFORE SHIFT
m15b MASK
ROW NUMBER
1
2
3
4
5
6
7
8
9
10
11
ONE-PIXEL DOWNWARD SHIFT

FIG. 15

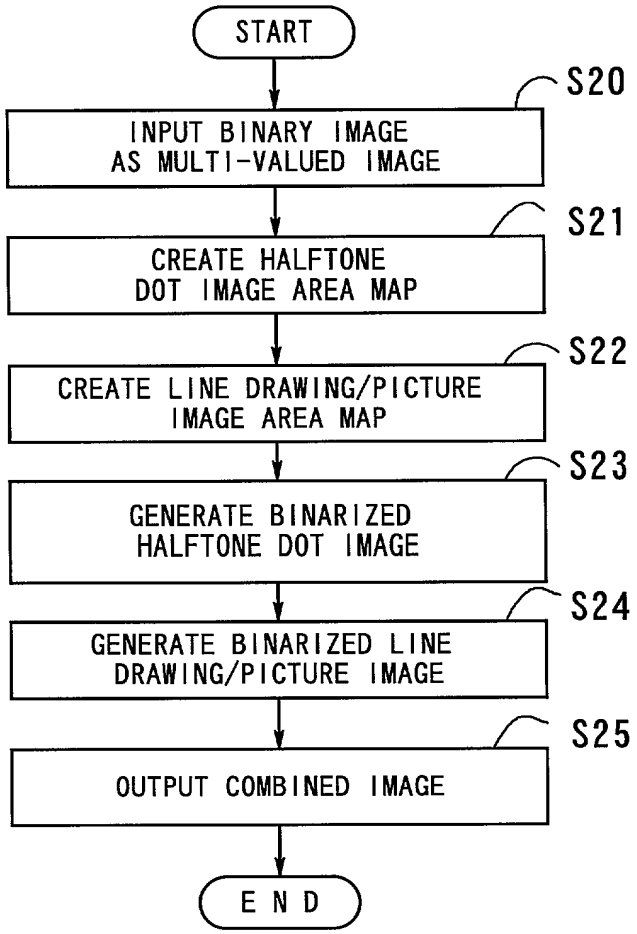

START
S20
INPUT BINARY IMAGE AS MULTI-VALUED IMAGE
S21
CREATE HALFTONE DOT IMAGE AREA MAP
S22
CREATE LINE DRAWING/PICTURE IMAGE AREA MAP
S23
GENERATE BINARIZED HALFTONE DOT IMAGE
S24
GENERATE BINARIZED LINE DRAWING/PICTURE IMAGE
S25
OUTPUT COMBINED IMAGE
END

FIG. 16